Network Meta-Analysis of Primary Care Hypertension Management Models in China (Postprint)

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Date: 2023-01-03T00:00:00+00:00

Abstract

Background: Hypertension, as a risk factor, can significantly increase the incidence and mortality of cardiovascular and cerebrovascular diseases among urban and rural residents. Effective control of hypertension is paramount in the prevention and treatment of cardiovascular and cerebrovascular diseases.

Objective: To comprehensively collect literature evaluating the effectiveness of different hypertension management models in China, assess the management outcomes of various models, and provide an evidence-based reference for further optimization of hypertension management models.

Methods: Using the statistical software StataSE-64 and employing blood pressure control rate as the evaluation metric, a network meta-analysis was performed on 18 included studies concerning hypertension management models, encompassing five modalities: hospital-community collaborative management, conventional community management, conventional hospital-based treatment management, general management, and "Internet+" management.

Results: Compared with the general management model serving as a blank control, the four models of hospital-community collaborative management, conventional community management, conventional hospital management, and "Internet+" management all demonstrated certain efficacy in hypertension control. The overall effect ranking was: hospital-community collaborative management "Internet+" management > conventional hospital treatment management > conventional community management > blank control. Specifically, the hospital-community collaborative management model exhibited significant effects on hypertension control; the efficacy of the hospital-community collaborative management model was comparable to that of the "Internet+" management model;

conventional hospital management was more effective than conventional community management.

Conclusion: To refine primary-level hypertension management models, it is essential to promote the establishment of a hospital-community-family management paradigm in primary medical and health institutions, facilitate the integration of chronic disease management models with the "Internet+ healthcare" model, and enhance whole-life-cycle management of chronic diseases.

Full Text

Preamble

A Network Meta-Analysis of Primary Hypertension Management Models in China. ChinaXiv Collaborative Journal. GU Mingyu, QIN Tingting, QIAO Kun, et al. A network meta-analysis of primary hypertension management patterns in China [J]. Chinese General Practice, 2022. [Epub ahead of print]. DOI: 10.12114/j.issn.1007-9572.2022.0872.

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Abstract
Background: Hypertension, as a risk factor, significantly increases the incidence and mortality of cardiovascular and cerebrovascular diseases among urban and rural residents. Effective control of hypertension is paramount for preventing and treating cardiovascular diseases. **Objective:** To comprehensively collect literature evaluating the effectiveness of different hypertension management models in China, assess the management effects of various models, and provide evidence for further optimization of hypertension management strategies. **Methods:** Using StataSE-64 statistical software and employing blood pressure control rate as the evaluation metric, we conducted a network meta-analysis of 18 included hypertension management studies involving five models: hospital-community joint management, conventional community management, conventional hospital treatment management, general management, and "Internet+" management. **Results:** Compared with general management as a blank control, the four models—hospital-community joint management, conventional community management, conventional hospital management, and "Internet+" management—all demonstrated effectiveness in hypertension control. The overall effect ranking was: hospital-community joint management "Internet+" management > conventional hospital treatment management > conventional community management > blank control. Among these, the hospital-community joint management model showed significant effects on hypertension control, with effects comparable to the "Internet+" management model, while conventional hospital management outperformed conventional community man-

agement. **Conclusion:** To improve primary hypertension management, efforts should promote the establishment of hospital-community-family management models in primary healthcare institutions, integrate chronic disease management with "Internet+ healthcare"models, and strengthen whole-life, whole-cycle management of chronic diseases.

[**Key words**] hypertension management model; primary health care; network meta-analysis

Hypertension is a cardiovascular syndrome characterized by elevated systemic arterial blood pressure (SBP and/or DBP). Long-term hypertension represents a major risk factor for coronary artery disease, heart failure, chronic kidney disease, and dementia. According to the 2019 Global Burden of Disease Study, elevated systolic blood pressure contributed to 10.8 million deaths globally, ranking first among all 87 risk factors. In China, an estimated 2.6 million deaths were attributable to elevated systolic blood pressure, accounting for 24.4% of total deaths, with 54.4416 million disability-adjusted life years [1]. The 2018 China Hypertension Survey (CHS) revealed a weighted prevalence of 23.2% among Chinese adults aged 18 and above, with a total of 244 million hypertensive patients [2]. Hypertension has become a pressing public health issue in China, imposing a heavy economic burden on society through its complications.

As a risk factor, hypertension significantly increases the incidence and mortality of cardiovascular and cerebrovascular diseases among urban and rural residents, making effective control crucial for prevention and treatment. Consequently, the Healthy China Action Plan (2019-2030) emphasizes intervention on cardiovascular risk factors like hypertension, aiming to prevent and avoid cardiovascular disease onset and recurrence. By 2030, China targets a hypertension standardized management rate exceeding 70%, awareness rate no lower than 65%, and continuous improvement in treatment and control rates [3]. However, current awareness, treatment, and control rates among Chinese hypertensive patients are only 46.9%, 40.7%, and 15.3%, respectively [2], representing a substantial gap from the 2030 goals. Hypertension management involves blood pressure assessment, disease screening, behavioral intervention, and clinical treatment for community residents, yet primary care still faces numerous challenges in technology, policy, and social support environments. Therefore, innovating primary community hypertension management models and improving management services is both necessary and urgent. This study employs network meta-analysis to evaluate the effectiveness of different hypertension management models on blood pressure control, providing evidence for establishing and optimizing hypertension management strategies.

1.1 Literature Search Strategy

We searched domestic and international databases including CNKI, Wanfang, and PubMed for studies on hypertension management models, using keywords "community," "primary health care" ("primary health care OR community"),

"hypertension management" ("hypertension management OR high blood pressure management") with a timeframe of 2009-2021. Retrieved abstracts were exported for initial screening. During literature acquisition, we reviewed titles and abstracts, excluding studies that did not meet inclusion criteria while retrieving those that did or were uncertain. Full texts were then thoroughly reviewed to exclude studies with exclusion criteria or non-compliance. Controversial literature underwent comparative processing and discussion when necessary to determine inclusion.

1.2 Study Inclusion Criteria

(1) **Study design:** Cohort studies or randomized clinical trials.

(2) **Study population:** Age $\geq$ 18 years; Diagnosis met criteria from the *Chinese Guidelines for Prevention and Treatment of Hypertension*, with office blood pressure measured on three different days showing SBP $\geq$ 140 mmHg and/or DBP $\geq$ 90 mmHg without antihypertensive medication [4]; Community permanent residents.

(3) **Management model:** Clear information on management model, including model name, intervention description, control description, follow-up frequency, and intervention duration.

(4) **Primary outcome:** Studies using hypertension control rate (number of patients with blood pressure $<$ 140/90 mmHg / total number of patients) (1 mmHg = 0.133 kPa) as the outcome indicator.

(5) **Clear inclusion and exclusion criteria.**

1.3 Study Exclusion Criteria

(1) **Study population:** Secondary hypertension; Individuals with communication barriers; Patients with severe diseases; Special populations such as pregnant or lactating women.

(2) **Primary outcome:** Studies using blood pressure value changes as outcome indicators.

(3) **Control group:** Self-before-after controls.

(4) **Data incompleteness:** Literature where required indicator data could not be obtained from study results.

1.4 Data Extraction and Quality Assessment

Literature content was extracted using a designed information extraction form, including: Population characteristics; Intervention measures; Control mea-

sures; Follow-up frequency; Study duration.

The "Risk of Bias Assessment" tool was used to evaluate bias risk across six domains: Random sequence generation: whether the method for generating random allocation sequences was described in detail; Allocation concealment: whether the method for concealing random allocation sequences was described in detail; Blinding: whether study participants and treatment implementers were aware of interventions in advance; Incomplete outcome data: whether attrition or withdrawal existed and whether reasons were clearly reported; Selective reporting: whether all expected outcome indicators were reported; Other bias sources: whether important bias risks existed.

Each included study was assessed across these six domains, with judgments of low bias ("low risk"), high bias ("high risk"), or lack of information/uncertain bias ("unclear"). Literature quality level criteria are shown in [Figure 1: see original paper].

Figure 1. "Risk of Bias Assessment" Literature Quality Level Criteria

1.5 Statistical Analysis

(1) **Qualitative analysis:** Descriptive methods were used to compare, summarize, and synthesize literature according to systematic review requirements.

(2) **Quantitative analysis:** StataSE-64 software was used for network meta-analysis of included literature data. Heterogeneity was tested using Q-test, with I^2 statistics indicating heterogeneity magnitude. If $I^2 > 50\%$ or $P < 0.05$, indicating substantial heterogeneity, random-effects models were used; otherwise, fixed-effects models were employed. Finally, funnel plots assessed publication bias among included studies.

2.1 Literature Search Results and Basic Characteristics

A total of 174 studies were retrieved from CNKI, Wanfang, and PubMed databases. After screening according to inclusion and exclusion criteria, 155 studies were excluded, with 19 studies ultimately included in the network meta-analysis. The screening process is shown in [Figure 2: see original paper].

Figure 2. Literature Search and Screening Process

(1) **Intervention population:** Most included studies selected community-dwelling hypertensive patients without other chronic comorbidities, with a few including elderly hypertensive patients.

(2) **Intervention measures:** Included studies involved conventional community management models, conventional hospital management models, and hospital-community joint management models. For software analysis clar-

ity, each management model was represented by letters or abbreviations (see).

The conventional community management model primarily integrates chronic disease control with family doctor contract services, including: Medication adjustment based on chronic disease control status; Medication adherence supervision and dietary guidance; Health education and daily care instruction; Guiding patients to undergo regular chronic disease indicator testing; Arranging regular hospital specialist follow-up visits and timely treatment adjustments.

Conventional hospital treatment management provides routine treatment and management, such as daily administration of calcium antagonists, β-blockers, diuretics, ACE inhibitors (ACEI), angiotensin II receptor blockers (ARB), and other antihypertensive drugs, combined with other medications for complications as needed, instructing patients to regularly monitor blood pressure, and adjusting medication dosage based on blood pressure and complication control [5].

The hospital-community joint management model is a three-tier health management approach with vertical linkage, providing more professional health management guidance for home-based chronic disease patients [6]. It relies on work teams composed of specialist and general practitioners who implement joint chronic disease management through chronic disease management records, including: Hospital specialist nursing teams providing guidance to community general nursing teams; Regular chronic disease management knowledge lectures; Community health service centers adjusting medications and treatment plans based on patient feedback; Communicating with patients and families to complete regular follow-up work.

The "Internet+ Healthcare" model combined with hospital-community-family management [7] is a novel internet-based chronic disease management model built upon the hospital-community-family framework, characterized by improved electronic health records, establishment of remote health management platforms, and provision of health management and guidance services through modern mobile apps.

Table 1. Management Model Abbreviations and Codes

Code	Model
hoscom	Hospital-Community Joint Management
blank	Conventional Community Management
-	Conventional Hospital Treatment Management
-	"Internet+" Management

(3) **Control management models:** Two studies did not describe control group management models in detail, one used self-management as control, these three groups served as blank controls, 12 used community

management models as controls, and 5 used hospital management models as controls.

(4) **Follow-up frequency:** Ten studies indicated regular follow-up without specifying timing, four did not mention follow-up, and the remaining five had varying frequencies, with monthly follow-up post-intervention being most common. Follow-up methods included health education, non-face-to-face visits, and home visits.

(5) **Outcome indicators:** In addition to hypertension control rate, some studies used blood pressure knowledge awareness, medication adherence, and lifestyle changes as indicators.

(6) **Duration:** Eight studies did not specify duration, five lasted 12 months, two lasted 6 months, three lasted 6 months, and one lasted 36 months.

2.2 Quality Assessment of Included Studies

No studies described allocation concealment methods in detail or explained blinding implementation. Regarding randomization, three studies used preference-based or community-based grouping, indicating high bias risk. One study had unclear data completeness. All studies showed no selective outcome reporting, though none described other bias sources. Ultimately, three included studies were rated as Level C (high bias), while the remaining studies were Level B (moderate bias). Since few articles compared hypertension management effects across different chronic disease management models domestically and internationally, and studies rarely fully complied with all six quality assessment domains, the overall literature quality rating was not high, creating substantial bias risk and slightly reducing result reliability (see).

Table 2. Quality Evaluation of the Included Literature

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias
Wang2020 [8]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Chen2017 [9]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Wu2019 [10]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Sun2020 [11]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Zhao2017 [12]	Unclear	Unclear	Unclear	Low risk	Low risk	Unclear

Study	Random Sequence Generation	Allocation Concealment	Blinding	Incomplete Outcome Data	Selective Reporting	Other Bias
Zhang2018 [13]	High risk	Unclear	Unclear	Low risk	Low risk	Unclear
Xie2018 [14]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Lan2014 [15]	Unclear	Unclear	Unclear	Low risk	Low risk	Unclear
Zhang2014 [16]	High risk	Unclear	Unclear	Low risk	Low risk	Unclear
Zhang2019 [17]	Low risk	Unclear	Unclear	Unclear	Low risk	Unclear
Huang2019	High risk	Unclear	Unclear	Low risk	Low risk	Unclear
Li2017 [19]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Zou2016 [20]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Wang2012 [21]	High risk	Unclear	Unclear	Low risk	Low risk	Unclear
Zhang Li2018 [22]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Liu2020 [23]	Unclear	Unclear	Unclear	Low risk	Low risk	Unclear
Tao2017 [24]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear
Tazeen2020 [25]	High risk	Unclear	Unclear	Low risk	Low risk	Unclear
Zhang Lx2019 [26]	Low risk	Unclear	Unclear	Low risk	Low risk	Unclear

2.3 Results Analysis

(1) Direct Comparisons of Included Studies

All included studies were disaggregated into pairwise comparisons for direct comparison. Since the outcome was dichotomous (whether patients achieved effective blood pressure control) and all studies used post-intervention data (retrospective causality), odds ratio (OR) was selected as the statistical measure. Direct comparison data were calculated and generated as the foundation for indirect comparison, with 1 and 2 representing intervention measures 1 and 2 (see).

Table 3. Data Format for Direct Comparison of Included Studies

Based on these studies, a network diagram was generated to visually represent

relationships among management models. Node and line sizes are proportional to study numbers—thicker lines indicate more studies comparing two models. Among all included studies, five management models formed multiple closed loops. Hospital-joint management and conventional community management nodes were largest, indicating the largest sample sizes and most frequent comparisons between these two models, followed by hospital-community joint management versus conventional hospital management. Closed loops enable further indirect comparisons and analysis of effect differences among interventions (see [Figure 3: see original paper]).

Figure 3. Evidence Network Diagram of Interventions

(2) Consistency Testing Between Direct and Indirect Comparisons

In network meta-analysis, differences between direct and indirect evidence are termed inconsistency, which can affect validity. Therefore, consistency testing is required. When consistency is good, direct and indirect comparisons can be combined. Inconsistency factor (IF) was used for testing:

IF = log(RR_{direct} - RR_{indirect}) = log(ROR)

IF values near 0 or ROR values near 1 indicate strong consistency between direct and indirect evidence. Inconsistency testing showed no statistically significant inconsistency, indicating good consistency; the B-C-D loop IF value approached 1.0 (see), suggesting good convergence. Node analysis further examined inconsistency at each network node, with all P-values > 0.05, confirming no inconsistency and good agreement between direct and indirect evidence, allowing combination of results (see).

Table 4. Inconsistency Testing of Interventions

Loop	Z Value	P Value	95%CI (truncated)
B-C-D	-	-	(0.00, 1.57)
A-B-C	-	-	(0.00, 1.70)
Loop-specific Heterogeneity (T^2)	-	-	-

Table 5. Node Analysis Table for Inconsistency Test of Interventions

Comparison	Direct	Indirect	Difference
	Coef.	Std. Err.	Coef.

(3) Influence of Direct Comparisons on Network Meta-Analysis Results

In network meta-analysis, direct comparisons among interventions differentially influence meta-analysis results. Therefore, we assessed the impact of direct com-

parisons on network meta-analysis outcomes to identify which comparisons most affected pooled results. Using direct comparison data, an evidence contribution plot was generated. Rows represent direct comparisons among interventions, columns represent indirect comparison results, and matrix cells show the influence degree of direct comparison results on combined network meta-analysis results. The direct comparison between intervention A and B influenced the combined direct-indirect results for A and B by 26.2%, influenced the indirect comparison between A and D by 13.0%, and influenced the overall hypertension management model network meta-analysis results by 11.5% (see [Figure 4: see original paper]).

Similarly, the evidence contribution plot reveals each direct comparison' s influence on indirect comparisons and overall network meta-analysis results. The direct comparison between hospital-community joint management (A) and conventional hospital treatment management (C) had the greatest influence on the entire meta-analysis at 22.6%, followed by conventional hospital treatment management versus "Internet+" management at 22.5%. The direct comparison between hospital-community joint management and conventional community management had the smallest influence at 11.5%.

Figure 4. Effect of Direct Comparison Results on Network Meta-Analysis

(4) Effect Size Comparisons After Combining Direct and Indirect Evidence

Each intervention was compared with others, with results presented as ladder plots and forest plots. First, hospital-community joint management served as the common comparator, with OR values and 95% confidence intervals compared with other interventions. The common comparator was then changed sequentially.

Compared with blank control, hospital-community joint management [OR = 7.16, 95%CI (3.29, 15.61)], conventional community management [OR = 2.10, 95%CI (1.02, 4.32)], conventional hospital treatment [OR = 3.04, 95%CI (1.32, 7.00)], and "Internet+" management [OR = 7.39, 95%CI (1.63, 33.56)] all significantly improved blood pressure control. "Internet+" management [OR = 1.03, 95%CI (0.26, 4.03)] showed similar effects to hospital-community joint management (see , [Figure 5: see original paper], [Figure 6: see original paper]).

Following this pattern, "Internet+" management versus blank control showed the highest OR value of 7.39. Stepwise comparison allowed ranking of the five interventions based on OR values: "Internet+" management > hospital-community joint management > conventional hospital treatment management > conventional community management > blank control.

Table 6. Ladder Plot of OR Values for Intervention Comparisons

Comparison	Hospital-Community	Conventional Community	Conventional Hospital	Internet+
Hospital-Community	-	(2.37, 4.91)	(1.41, 3.93)	(3.29, 15.61)
Conventional Community	(0.25, 3.79)	-	(0.20, 0.42)	(0.39, 1.23)
Conventional Hospital	(1.02, 4.32)	(0.07, 1.14)	-	(0.25, 0.71)
Internet+	(0.81, 2.58)	(1.32, 7.00)	(0.12, 1.46)	-

Figure 5. Forest Plot for Pairwise Comparison of Interventions

Figure 6. Forest Plot for Comparison of Interventions

(5) Cumulative Ranking Probability of Intervention Effects

Based on the above analysis, SUCRA (Surface Under the Cumulative Ranking curve) method was used to systematically rank the effectiveness of hypertension management models. SUCRA values range from 0-100, with higher values indicating better management models, visualized as cumulative ranking probability plots. Larger area under the curve indicates greater likelihood of being the best model, with results convertible to visual ranking bar charts.

Among all interventions, hospital-community joint management achieved the highest SUCRA value of 86.8, followed by "Internet+" management at 85.1. These two models far outperformed others. The final ranking of the five hypertension management models was: hospital-community joint management > "Internet+" management > conventional hospital treatment management > conventional community management > blank control (see [Figure 7: see original paper]).

Figure 7. Ranking Diagram for Comparison of Interventions

(6) Publication Bias of Included Studies

Publication bias occurs when statistically significant studies are more likely to be submitted and published than non-significant ones, creating systematic differences between reported and actual results. In network meta-analysis, funnel plots examine publication bias as in classical meta-analysis (see [Figure 8: see original paper]).

Each direct comparison in included studies corresponds to a point in the plot, with 11 points left of center, 6 right of center, and the remainder on the line. The point distribution forms an approximate triangle, relatively symmetric with points on both sides in the upper portion. However, 2 points lie outside on the

left and 4 outside on the right, indicating obvious publication bias that may affect result validity.

Figure 8. Funnel Plot of Included Studies

3 Discussion

The network meta-analysis results show that compared with blank control, hospital-community joint management, conventional community management, conventional hospital management, and "Internet+" management all have certain effects on hypertension control. The overall effect ranking is: hospital-community joint management "Internet+" management > conventional hospital treatment management > conventional community management > blank control.

3.1 Significant Effects of Hospital-Community Joint Management Model

The results demonstrate that the hospital-community joint management model can improve blood pressure control rates and quality of life for hypertensive patients. Electronic record establishment and utilization play crucial roles under this model. As the living environment for hypertensive patients, communities enable family doctors to update electronic records promptly through face-to-face, telephone, or WeChat follow-ups, provide targeted health education based on individual blood pressure control status, and maintain closer attention to patients' lifestyle behaviors. Combined with hospital guidance, this ensures health education quality while enabling hospital specialists or general practitioners to promptly understand patient condition dynamics and provide in-depth, precise hypertension control strategies. For patients, community-based hypertension management is more convenient, saving time costs and improving health service equity and accessibility. With guidance from general hospitals, patients' stereotypical impressions of community technical levels are alleviated, actively mobilizing patient participation.

3.2 Comparable Effects Between Hospital-Community Joint Management and "Internet+" Management

In the OR value ladder plot, "Internet+"management showed the best blood pressure control effect at 1.01 times that of hospital-community joint management [OR = 1.01, 95%CI (0.25, 4.08)], while the ranking plot concluded hospital-community joint management was best with the highest SUCRA value of 87.3, followed by "Internet+" management at 84.3. First, the large 95%CI in the ladder plot suggests low credibility for "Internet+" management being the best, possibly because only one study on "Internet+" management was included with very significant effects. Second, management model classification in included literature was somewhat ambiguous, with some hospital-community management models also incorporating "Internet+" measures such as WeChat groups

and mobile app-based blood pressure monitoring, creating overlapping effects between the two models.

3.3 Conventional Hospital Management Outperforms Conventional Community Management

Both OR ladder plots and ranking plots demonstrate that conventional hospital management is more effective than conventional community management for blood pressure control. From the hospital perspective, patients under conventional hospital management are generally inpatients with poorer blood pressure control, receiving more intensive medication guidance and blood pressure monitoring, thus achieving better results. Additionally, conventional hospital management sometimes provides health education through communities with higher frequency and quality. Furthermore, most included studies had intervention durations of 1-2 years, which is relatively short, while community management models focus on daily lifestyle and behavior guidance with slower effects, potentially contributing to poorer performance compared with hospital management. From the patient perspective, hospitals possess better technical capabilities and medical resources, leading to better compliance and blood pressure control outcomes.

4.1 Ambiguous Model Boundaries

This study summarized Chinese chronic disease management models into four categories, but literature review reveals varying degrees of differences across regions. The boundaries between models were somewhat ambiguous, with conventional community and hospital management often incorporating "Internet+" measures, creating mutual penetration among the four models and overlapping effects on blood pressure control—contributing to result bias. Additionally, the publication timeframe spanned from 2012 to 2020, during which Chinese chronic disease management models underwent tremendous changes, further complicating clear model definition.

4.2 Lack of Author Contact for Comprehensive Information

During literature screening, authors should have been contacted to clarify incomplete or uncertain information. However, due to time constraints, this was not done, and determinations were made through inter-literature comparisons instead, potentially excluding some high-quality studies and causing errors in quality assessment.

Author Contributions: LI Xingming formulated overall research objectives, determined research direction, and conceptualized the manuscript. GU Mingyu was responsible for literature screening, data extraction, and manuscript drafting and revision. QIAO Kun participated in manuscript drafting, revision, data processing, and analysis. QIN Tingting reviewed and edited the manuscript and

participated in revision. BAI Xinyuan, WANG Yao, and YANG Yutong provided suggestions on search strategies and participated in manuscript revision.

Conflict of Interest: No conflicts of interest exist in this article.

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Appendix: Information Extraction Table for Included Literature

Table 1. Literature Information Extraction Table for Hypertension Management Models

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Evaluation of hospital-community integrated management model for elderly hypertension prevention and treatment (Wang2020)	Elderly hypertensive patients in community	1) Establish patient records and examination results; 2) Establish management team; 3) Conduct health education	Conventional community management: comprehensive patient assessment, medication adjustment based on condition	Regular follow-up	—

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of hospital-community comprehensive management model on treatment efficacy and adherence (Chen2017)	Hypertensive patients from 20 communities receiving hospital services	1) Establish health records for all patients; 2) Health lectures, education brochures, community intervention team; 3) Regular team visits; 4) Hospital treatment	Tertiary hospital conventional treatment and management: routine antihypertensives, complication interventions, regular blood pressure monitoring, medication adjustment	Regular team visits	12 months

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of hospital-community comprehensive management model on treatment efficacy and adherence (Wu2019)	Hospital hypertensive patients	1) Implement hospital-community comprehensive management with health records; 2) Health lectures; 3) Community intervention team; 4) Regular team visits; 5) Regular re-examination	Conventional treatment and management	Regular team visits	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Analysis of hypertension management effect through comprehensive intervention by tertiary hospital general medicine department combined with community (Sun2020)	Hypertensive patients in community health service centers	Implement comprehensive intervention model combining tertiary hospital general medicine department with community health service center	Community health service center conventional health management	Regular follow-up	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Application analysis of hospital-community-family nursing intervention model in elderly hypertensive patients (Zhao2017)	Elderly hypertensive patients in hospital	Hospital-community-family nursing intervention model: 1) Personal records; 2) Discharge guidance; 3) Health education; 4) Community staff training; 5) Designated caregiver/family supervision; 6) Follow-up	Conventional nursing: medication guidance, health education, dietary adjustment, blood pressure measurement	Within 30 days post-discharge; every 2 months	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Preliminary exploration of hospital-community hypertension management model in rural communities (Zhang2018)	Hypertensive patients with community health records in Dali Prefecture (2010-2014)	Hospital group: regular tertiary hospital physician visits to community hospital for consultation, blood pressure monitoring, medication discussion, health education activities with family participation	Community group: dynamic community physician follow-up, home visits, peer education; Self-intervention group: self-medication monitoring, periodic consultation	Regular community physician visits	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Evaluation of hospital-community integrated management model for elderly hypertension prevention and treatment (Xie2018)	Primary hypertensive patients in Huaxing Street Health Service Center chronic disease database	Hospital-community integrated management: 1) Electronic and paper records; 2) Targeted health manuals; 3) Weekly health lectures; 4) Management team; 5) Integrated platform; 6) Cardiologist on-site clinics; 7) Regular follow-up; 8) Monthly analysis and feedback	Traditional single community management: community physician full-process management, regular follow-up	Every half-month hospital expert visits for treatment adjustment	12 months

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of hospital-community comprehensive management model on medication adherence and blood pressure control (Lan2014)	Hypertensive patients in Shipai Town Community, Dongguan	1) Provide stethoscopes; 2) Education materials; 3) Lifestyle adjustment; 4) Self-measurement record card; 5) Treatment adjustment	Conventional hospital outpatient treatment: immediate health education, self-exercise, dietary control	Monthly visits, treatment recommendations based on condition	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of hospital-centered community management model on quality of life and hypertension knowledge awareness (Zhang2019)	Permanent hypertensive patients in Xihe Community, Zhangjiacun Friendship Community Service Center, Xi' an (Nov 2016-May 2017)	Hospital-centered community management model	Conventional health management methods	Regular follow-up	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of comprehensive health management model on medication compliance and blood pressure control rate (Huang2019)	Hypertensive patients in community	Comprehensive health management: 1) Establish comprehensive health service center with family doctor team communication; 2) Group-based comprehensive management; 3) Individualized health management plans; 4) Family health guidance through lectures and follow-up	Conventional management per family doctor contract service	Regular follow-up	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Evaluation of hospital-community coordinated management model on standardized community hypertension management (Li2017)	Randomly selected hypertensive patients in community meeting criteria	Hospital-community coordinated management: 1) Identify management and prevention problems; 2) Leverage hospital expertise and resource integration; 3) Solve key prevention difficulties; 4) Optimize management	Conventional community medical staff management	24 months	

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of hospital-community integrated management model on self-management ability in elderly hypertensive patients with diabetes (Zou2016)	Elderly hypertensive patients with diabetes in our hospital (Jan 2013-Jan 2015)	Hospital-community integrated management: 1) Regular community physician training; 2) Tertiary hospital physicians formulate initial treatment plans; 3) Community physicians responsible for maintenance therapy, monitoring, records, long-term dynamic management; 4) Integrated service team; 5) Health education; 6) Self-management guidance	Traditional single community management: comprehensive full-process management including medication supervision, timely adjustment, lifestyle guidance, referral when necessary	Regular follow-up	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Analysis of community health management effectiveness in elderly hypertensive patients (Wang2012)	Elderly hypertensive patients in You'anmen Community Health Service Center, Beijing (Jan 2011-Feb 2012)	Management group: regular hypertension knowledge training, standardized community medication, 1-year health education and lifestyle intervention	Conventional diagnosis and treatment	12 months	

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Empirical study on community hypertension health management based on regional medical consortium (Zhangqi 2018)	Hypertensive patients in 3 community health institutions (A, B, C) in regional medical consortium led by Second Hospital of Shanxi Medical University (from June 2015)	Effective utilization of medical consortium resources for health management while implementing conventional diagnosis and treatment. Baseline survey and 1-year follow-up evaluation	Conventional chronic disease management: telephone follow-up, simple oral education; tertiary hospital general medicine department activities through broad notification	Regular follow-up	–

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Effect of Internet+ doctor-centered chronic disease management model for community hypertensive patients (Liu2020)	Primary hypertensive patients in community health service centers in Xiangtan City (Jan 2017-Jan 2018) as observation group; 100 primary hypertensive patients in Xiangtan Central Hospital general outpatient as control	Internet+ doctor-centered chronic disease management: 1) Regular doctor follow-up; 2) System generates data and risk alerts from self-monitoring; 3) Lifestyle intervention; 4) Manual service for referral and medication adjustment; 5) Electronic health education; 6) On-site education and consultation	Conventional diagnosis and treatment	–	

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
Study on county hospital-community hospital joint model for community hypertension control (Tao2017)	Hypertensive patients in Wangfen Branch of Wuyi County Traditional Chinese Medicine Hospital (established through hospital-township health center integration) from March 2014	"County hospital-community hospital" joint model management	Conventional diagnosis and treatment, annual community physical examination and health records	24 months	

Study	Population	Intervention Measures	Control Measures	Follow-up Frequency	Duration
A Community Based Intervention for Managing Hypertension in Rural South Asia (Tazeen2020)	Hypertensive patients aged $ $40 years	Public-coordinated community management: home visits, blood pressure measurement, counseling	Routine care including existing community services, community health workers conducting home visits only for maternal/child health. Clinics had no designated hypertension reception desk or care coordinator	24 months	
Analysis of community health management methods and effects for hypertension (Zhangsx2019)	Hypertensive patients registered in Dagang Street Community Health Service Center, Tianjin Binhai New Area (Feb 2017-Mar 2018)	Community health management: 1) Establish management team; 2) Health management including education, medication guidance, behavioral intervention	Conventional health management: community nurse follow-up once monthly for control group; experimental group: monthly home visits, weekly telephone/WeChat follow-up	–	